

ASBESTOS SOLIDITY STABILIZER

FOR PREVENTING DISPERSION
OF ASBESTOS

GMC-200



GUN MYUNG TECHWIN CO. LTD.

Patent registration / New technology certification / Eco label certification

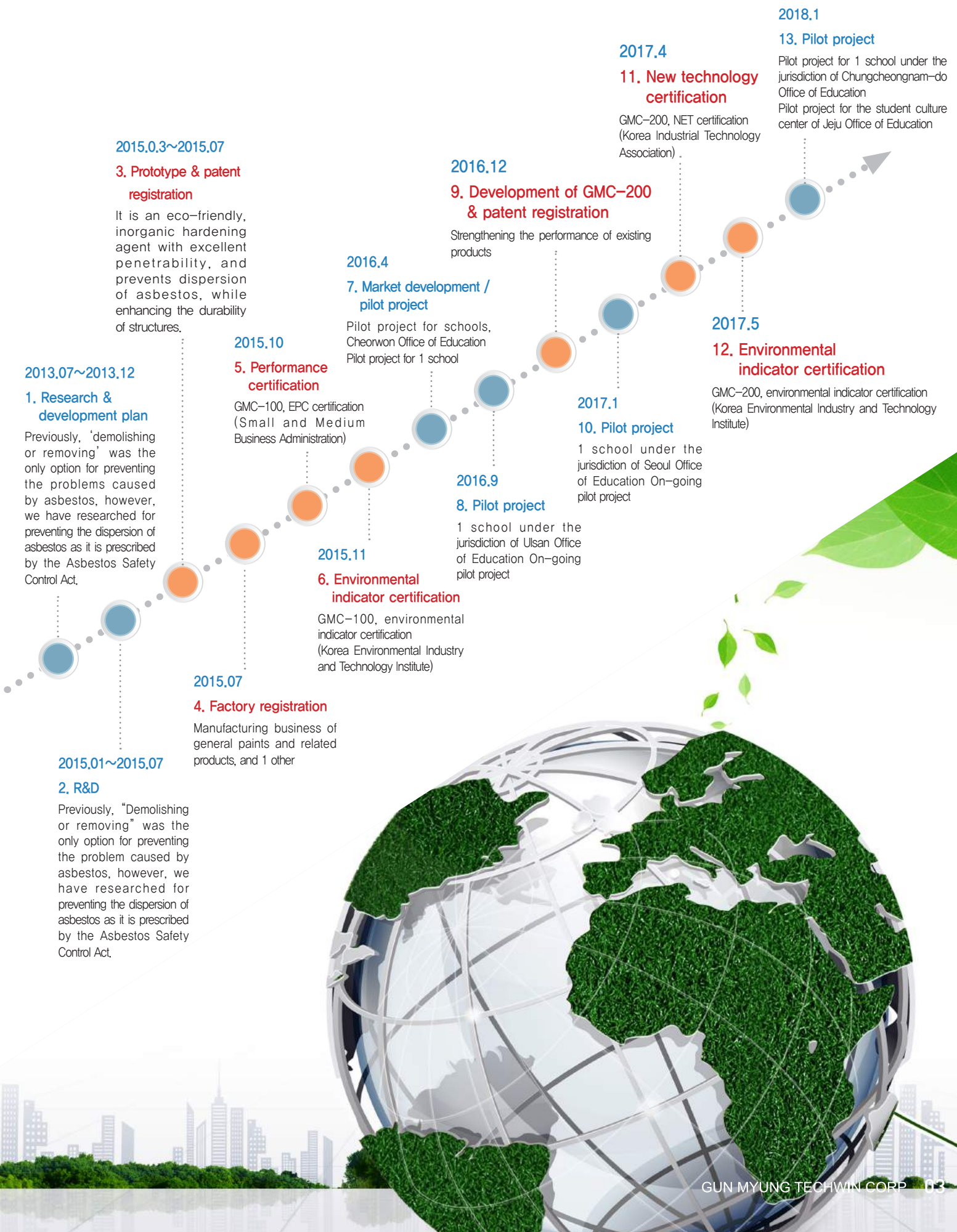
Affiliated R&D institute / ISO quality management / ISO environmental management

Technology-innovative small and medium business (INNOBIZ certification) / Promising small and medium business



General status

■ Company name	Gun Myung Techwin Co. Ltd
■ CEO	Cha, Seong-hak
■ Date of establishment	July 9, 2008
■ Addresses	Head office: Rm. 1301, Building A, Heungdeok IT Valley, 13 Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do Manufacturing plant: Rm. 1301, Building A, Heungdeok IT Valley, 13 Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do
■ Website	www.gmtwin.com
■ Major business areas	Asbestos solidity stabilizer, CCTV surveillance & construction services for environment and safety
■ Major certifications	Performance certification, patent, affiliated R&D institute, certification of excellent venture company and a promising small and medium business in Gyeonggi-do ISO9001, ISO14001, ISO9001, ISO14001, environment certification, INNOBIZ, new technology certification



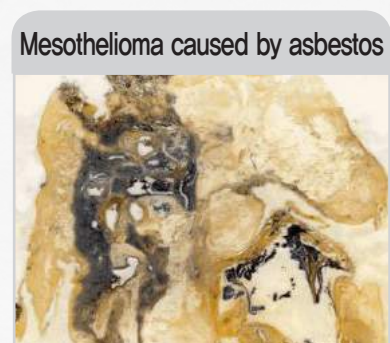
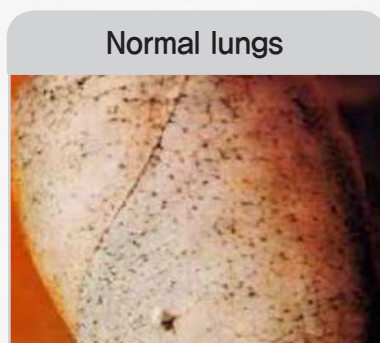
Riskiness of asbestos

Asbestos, which is called **the silent killer or quiet time bomb**, has a **latent period of 20~40 years**. It is a **class 1 cancer-causing agent** designated by the World Health Organization (WHO), and there is no limitation for safety regarding the exposure to asbestos.



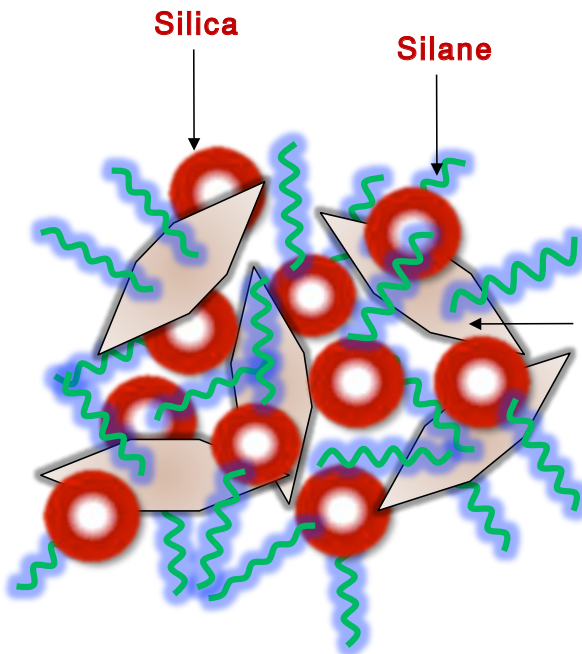
Diseases related to asbestos

The diseases related to asbestos are Asbestosis, Lung cancer and Mesothelioma, and in most cases, there is no distinct cure for these diseases.



About GMC-200 Technology

Core material of asbestos solidity stabilizer and its function



Solidifying the asbestos particles

(Nano-silica / layered phyllosilicate)

&

Penetrability

Improving the water surface tension by processing with hydrophobic silane

**Silane grafted
Silica & Layer Silicate**

Name of technology	Patent No. 10-1673851 – Technology applied with a composition, which includes inorganic acid compounds, preventing the dispersion of asbestos
Applicable use	Preventing the generation of dispersed particles of asbestos by applying penetrative coating to construction materials
Applicable areas	Facilities constructed by using the materials containing asbestos, such as asbestos fiber, slate, cubicle, sheath and insulation material (schools, public organizations, slate, abandoned mine)
Major ingredients	Silicate nano-colloid / saline / water-based acrylic resin



About GMC-200 Product

It is a product **stabilizing asbestos particles**, which can be created by physical influences, such as damage and external vibration, by **flocculating and solidifying them** after being penetrated into the surface or the interior of construction materials containing asbestos.



Asbestos solidity stabilizer GMC-200

01 Patent No. 10-1673851

Registered as a patent for the composition, which includes inorganic acid compounds, preventing the dispersion of asbestos

02 Patent No. 10-1840971

Patent registration of the composition with improved penetrative performance preventing the dispersion of asbestos

03 New technology certification No. 1077

It is a product which its dustability, penetrative performance and water resistance are improved by applying the asbestos dispersion prevention technology using silicate nano-colloid, saline and water-based acrylic resin

04 Environmental indicator certification No. 17094

Reducing the pollution of local and living environments and harmful substances

About GMC-200 Product

Applicable areas of GMC-200



Heat-reserving board & insulation



Sound-absorbing materials



Gypsum cement plate(tax)



Fire resistive covering materials



asbestos abandoned mine



building asbestos waste



asbestos slate



Plastering work of insulation
(fireproof spray coat)



Building asbestos Exterior

01

Application time

If air quality measurement exceeds 0.01 piece/cc based on the environmental standard

02

Application method

Spray the product evenly to make them penetrated into the material

03

Applicable parts

Ceiling fiber and fire resistive covering material containing asbestos in building demolition sites

Differences between asbestos removal and using solidity stabilizer

■ Removal of asbestos vs. prevention of asbestos dispersion vs. GMC-200

Classification	Removal	Prevention of asbestos dispersion	GMC-200
Content	<ul style="list-style-type: none"> Authorized business removes asbestos, and re-constructs Necessary to cooperate with waste disposal contractors Additional constructions may be necessary after removal 	<ul style="list-style-type: none"> Product for coating inorganic synthetic resin Using the painting skills (application on front only) Most of the businesses are using imported products 	<ul style="list-style-type: none"> Eco-friendly water-based asbestos solidity stabilizer Using the painting skills (application on both sides) Patent for composition (No. 10-1673851) Patent for improved penetration performance (No. 10-1840971) New technology certification (No. 1077) Environmental certification (No. 17094)
Period	Minimum 1 month	3~5 days	3~5 days
Advantages	<ul style="list-style-type: none"> Possible to remove asbestos completely 	<ul style="list-style-type: none"> No creation of designated wastes and secondary environmental pollution 	<ul style="list-style-type: none"> Approved dispersion preventing performance / penetrative performance / water resistance (Korea Industrial Technology Association) No creation of designated wastes and secondary environmental pollution
Disadvantages	<ul style="list-style-type: none"> High cost (for demolition and using materials to replace asbestos) Construction or expansion is limited Causing secondary environmental pollution Creating costs for waste disposal and taking much time 	<ul style="list-style-type: none"> Limited application to actual environments due to lack of water resistance Lack of verification of dispersion prevention performance Not possible to be processed as general wastes for further demolition 	<ul style="list-style-type: none"> Not possible to be processed as general wastes for further demolition

How to use asbestos solidity stabilizer

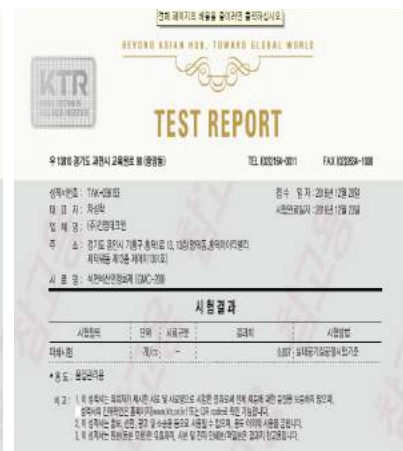
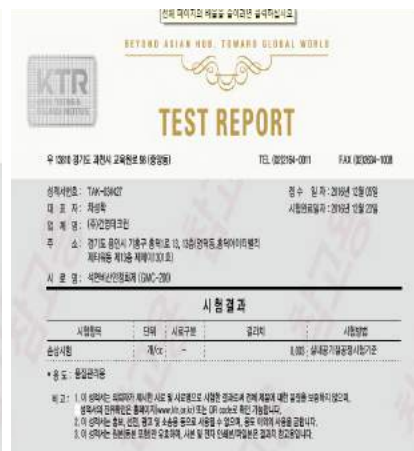
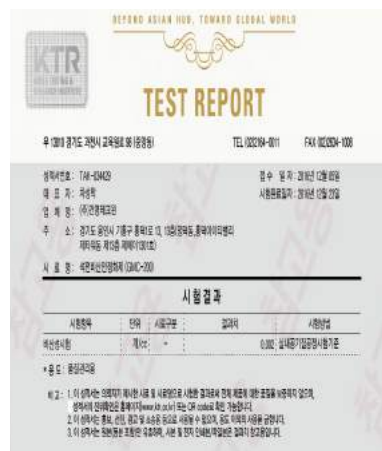
Classification	Method of using the product according to the market of asbestos solidity stabilizer
Maintenance of buildings and abandoned mines with asbestos	<ul style="list-style-type: none"> Asbestos materials of the domestic schools, public offices and general buildings cannot be removed at the same time, and people have to be under the influence of asbestos while waiting for its removal. In the case of abandoned mines, it is not possible to remove the remaining asbestos, and the nearby residents may be influenced consistently. It is possible to secure safety from the influence of asbestos without removing it by spraying the asbestos solidity stabilizer.
Apply when demolishing asbestos-containing structures	<ul style="list-style-type: none"> Presently, the removal of asbestos from schools or public offices still creates residual asbestos dusts, and the indoor air quality is still below the standard. Environmental organizations insist that the removal work is diffusing the pollution created by asbestos By using the asbestos solidity stabilizer when removing asbestos, it is possible to solve the problems of the worker's safety, and to prevent the dispersion of asbestos after removal.

■ **Applicable areas for using the asbestos solidity stabilizer** : Maintenance of buildings containing asbestos materials / demolition work of buildings containing asbestos materials

Reliability of the product

Performance of preventing the dispersion of asbestos particles

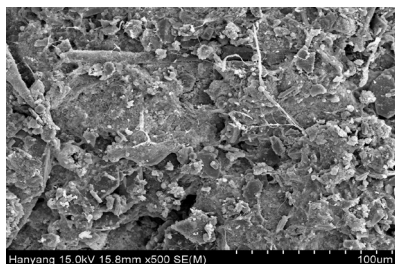
Evaluation items	Unit	Standard	Result	Evaluation method
1. Test for fiber dispersion caused by air flow	Piece/cc	0.01 piece/cc	0.002	KS M 2757 : 2014
2. Test for fiber dispersion caused by surface damage	Piece/cc	0.01 piece/cc	0.003	
3. Test for fiber dispersion when it is shredded	Piece/cc	0.01 piece/cc	0.003	



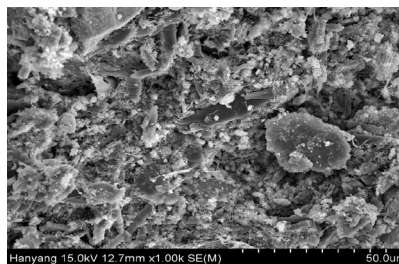
- Analysis sample: GMC-200 coated asbestos fiber
- Analysis agency: Korea Testing & Research Institute (KTR)
- Date of analysis: December 23, 2016

Analysis using a scanning electron microscope (SEM)

▶ Asbestos fiber



Surface(x500)

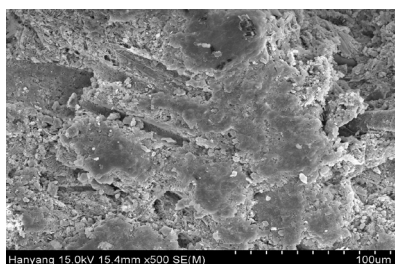


Fracture surface(x1000)

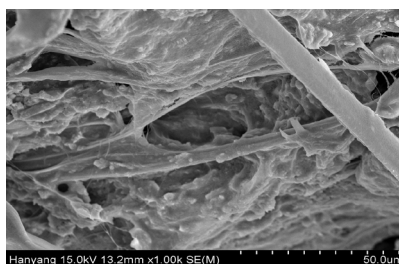


Fracture surface(x3000)

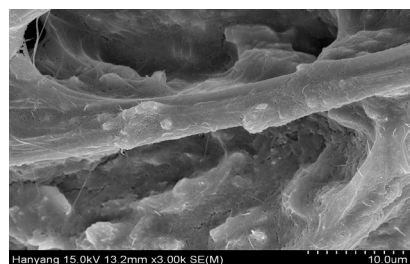
▶ After applying GMC-200



Surface(x500)



Fracture surface(x1000)



Fracture surface(x3000)

Comparison of each product's performance of preventing the dispersion of asbestos

Evaluation items	Unit	Standard	Evaluation result					Evaluation method
			Blank (Asbestos plate)	GMC-200 (New product)	Ref-A (Exx)	Ref-B (xxx-100)	Ref-C (XX-1000)	
1. Fiber dispersion test (Aerosol)	Piece /cc	0.01 or less	0.023	0.002	0.017	0.007	0.011	KS M 2757:2014 (KTR)
3. Fiber dispersion test (Shredding)			0.037	0.003	0.027	0.019	0.014	



Certified test results (Korea Testing & Research Institute/KTR) 2017.2.9

Basic property of each product & coating characteristics of asbestos board

Evaluation items	Evaluation result				Method
	GMC-200 (Gun Myung developed product)	Ref-A (xxx-100)	Ref-B (Exx)	Ref-C (xx-1000)	
Appearance	Translucent suspension	Translucent suspension	Translucent suspension	Translucent suspension	Visual observation
pH	10±0.2	11±0.2	11±0.2	11±0.2	pH meter @25°C
Viscosity (Viscosity, mPa-s)	1.5±0.2	2.0±0.2	1.7±0.2	1.8±0.2	AND SV-10 @25°C
Solid content (%)	9.4±0.2	20±0.1	18±0.3	21±0.3	@120°C/2hr
Coating characteristics	Good	Powder separation	Powder separation	Powder separation	@120°C/2hr



Result of penetration analysis through EDS (elementary analysis)

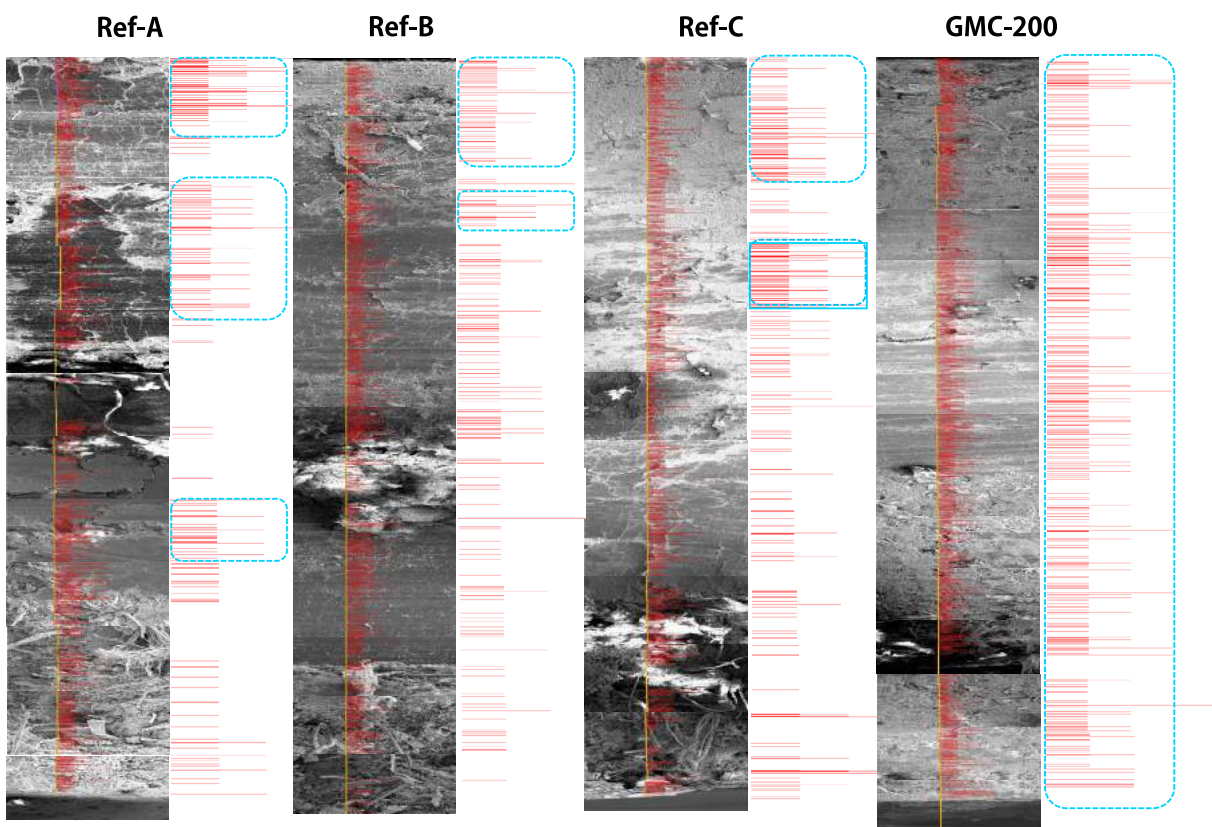
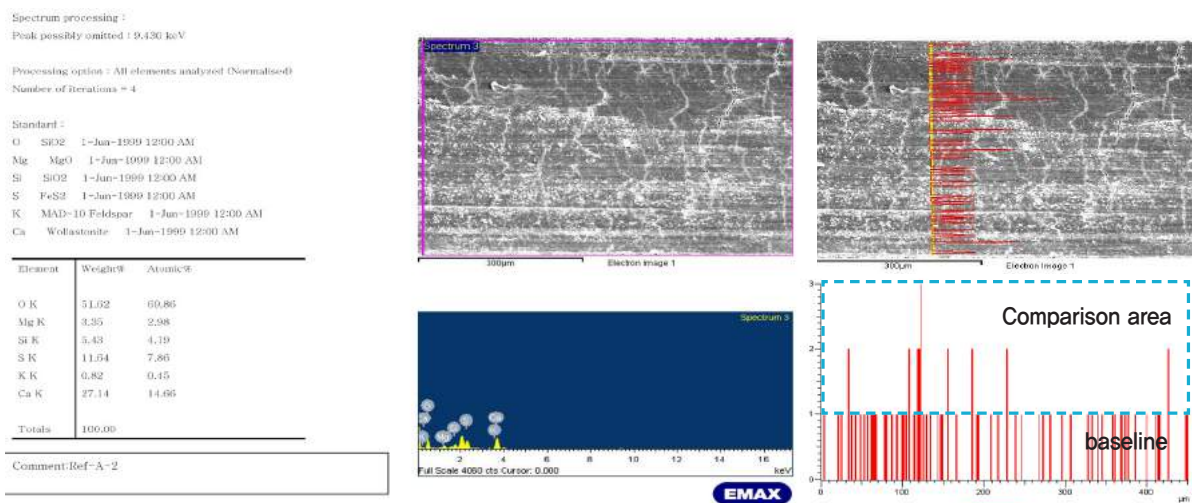
■ **Result analysis** : Comparison of internal distribution according to depth realized by comparing the graph of K-edge spectrum's intensity of K element

■ **Evaluation sample** : GMC-200 & 3 prototypes (Ref.-A,B,C)

■ **Making a specimen** : Coat the back side of asbestos fiber, of which the size is that of a slide glass, with 4 solutions for evaluation. Dry it at 100°C for 1 hour after making them penetrate for 60 minutes. Cut the specimen vertically, and analyze the element distribution of the fracture surface through EDS.

※ Analyze the elements using the potassium (K) as an indicator (In the case of Ref.B, coat by randomly mixing with K₂SiO₃)

■ **Analysis equipment** : HITACHI-S4800 FE-SEM (Common equipment center of Hanyang University)



Expected effects

01

Technical side

- Establishing application technology of coating stabilizer for preventing the dispersion of asbestos
- Securing water resistance improvement technology for water-soluble paint
- Securing technology of protective agent's penetration performance for preventing the water absorption of concrete buildings
- Possible to replace existing paint ingredients
- Establishing independent technology based on the standardization of construction process

02

Economic & industrial side

- Increase the use of dispersion preventing agent by expanding the application to asbestos containing materials
- Reducing the national budget by replacing the existing method of removing asbestos
- Economic vitalization by hiring new personals while saving the development cost
- Preventing the secondary pollution by improving the residential environment without creating wastes

03

Social side

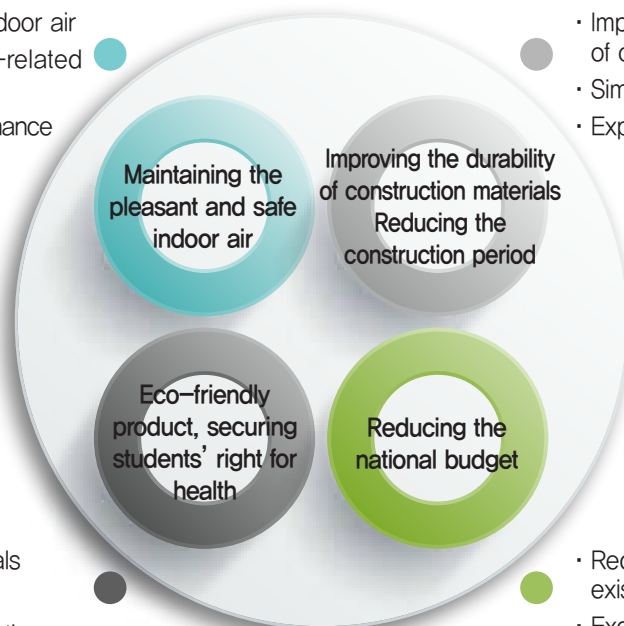
- Creating jobs through developing independent technology
- It is possible to convert the dispersion-preventing agent, which is presently used for the removal of asbestos and producing plate-type materials, into a high value-added business
- Solving the problems of air pollution

Surface-hardening agent for preventing dispersion

GMC-200

- Maintaining the pleasant indoor air
- Preventing the asbestos-related diseases
- Excellent penetration performance

- Improving the durability (water resistance) of construction materials
- Simple application
- Expanding the application area



- Zero heavy metals
- Zero wastes
- Zero VOCs detection
- Lower than TVOC standard
- Lower than VOCs standard

- Reducing cost by 60% comparing to the existing removal method
- Excellent ratio of preventing the dispersion of asbestos

Applicability of technology



1. Pre-investigation

- Check the application area
- Measure the area, and estimate the amount of materials



2. Measurement of indoor air quality

- Check the indoor air quality before application



3. Security zone setup

- Install a control facility at the construction site



4. Preconditioning

- Remove foreign objects and dusts
- Arrange and repair the application area



5. Electricity / wiring

- Arrange the wires to apply the product on the surface



6. Reinforcement work

- Reinforce materials attached to the ceiling
- Reinforce floor and walls

■ Apply asbestos solidity stabilizer



7. Application on upper areas

- Check the application area
- Measure the area, and estimate the amount of materials



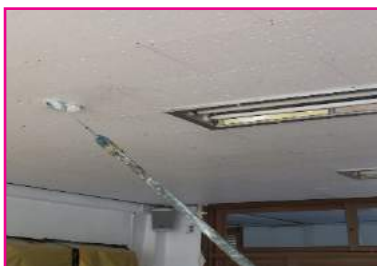
8. Application on lower areas

- Apply by spraying it twice
- Apply thoroughly and evenly



9. Reinforcement and arrangement

- Remove the residual materials and check the surface



10. Finishing application of each part

- Apply to finish the stained area



11. Measuring the indoor air quality

- Measure the indoor air quality in the same classroom after application



12. Cleaning after completion

- Clean the area thoroughly after completing the application

Certification and registration status



Letter of patent
No. 10-1673851



Letter of patent
No. 10-1840971



New technology certification
No. 1077



Environmental indicator
certification
No. 17094



Letter of patent
No. 10-1541006



Certificate of quality
management system
ISO 9001



Certificate of environmental
management system
ISO 14001



Certificate of R&D institute
affiliated to enterprise



Certificate of Inno-Biz



Promising small and medium
business of Gyeonggi-do





The company prioritizing the people
The company prioritizing the environment
GUN MYUNG TECHWIN CO. LTD.



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